# 8077/7054

## Power Pentode

**9-PIN MINIATURE TYPE**

**For Mobile-Communications Equipment Operating from 6-Cell Storage-Battery Systems. Useful as a Class-C RF-Power-Amplifier, Oscillator, and Frequency-Multiplier Tube up to 40 Mc, and as a Modulator and AF-Power-Amplifier Tube.**

### GENERAL DATA

**Electrical:**

Heater Characteristics and Ratings *(Absolute-Maximum Values):*

| | | |
|---|---|---|
| Voltage (AC or DC)[a] | 13.5 ± 1.5 | volts |
| Current at heater volts = 13.5 | 0.275 | amp |
| Peak heater-cathode voltage: | | |
| Heater negative with respect to cathode | 120 max. | volts |
| Heater positive with respect to cathode | 120 max. | volts |

Direct Interelectrode Capacitances (Approx.):[b]

| | | |
|---|---|---|
| Grid No.1 to plate | 0.063 | μμf |
| Grid No.1 to all other electrodes except plate | 10.2 | μμf |
| Plate to all other electrodes except grid No.1 | 3.5 | μμf |

**Characteristics, Class A₁ Amplifier:**

| | | |
|---|---|---|
| Heater Voltage | 13.5 | volts |
| Plate Supply Voltage | 250 | volts |
| Grid No.3 | *Connected to cathode at socket* | |
| Grid No.2 Supply Voltage | 150 | volts |
| Cathode Resistor | 120 | ohms |
| Plate Resistance (Approx.) | 0.1 | megohm |
| Transconductance | 11500 | μmhos |
| Plate Current | 19 | ma |
| Grid-No.2 Current | 3.5 | ma |
| Grid-No.1 Voltage (Approx.) for plate μa = 20 | -10 | volts |

**Mechanical:**

| | |
|---|---|
| Operating Position | Any |
| Type of Cathode | Coated Unipotential |
| Maximum Overall Length | 2-3/16" |
| Maximum Seated Length | 1-15/16" |
| Length, Base Seat to Bulb Top (Excluding tip) | 1-9/16" ± 3/32" |
| Diameter | 0.750" to 0.875" |
| Dimensional Outline | See *General Section* |
| Bulb | T6-1/2 |
| Base | Small-Button Noval 9-Pin (JEDEC No.E9-1) |

Basing Designation for BOTTOM VIEW. . . . . . . . . . . . 9GK

Pin 1 - Cathode
Pin 2 - Grid No.1
Pin 3 - Grid No.3, Internal Shield
Pin 4 - Heater
Pin 5 - Heater
Pin 6 - No Internal Connection
Pin 7 - Plate
Pin 8 - Grid No.2
Pin 9 - Grid No.3, Internal Shield

### AF POWER AMPLIFIER — Class $A_1$

**Maximum Ratings,** *Absolute-Maximum Values:*

| | | |
|---|---|---|
| PLATE VOLTAGE | 330 max. | volts |
| GRID No.3 (SUPPRESSOR GRID) | *Connect to cathode at socket* | |
| GRID-No.2 (SCREEN-GRID) VOLTAGE | 180 max. | volts |
| GRID-No.1 (CONTROL-GRID) VOLTAGE: | | |
| Negative-bias value | 55 max. | volts |
| Positive-bias value | 0 max. | volts |
| GRID-No.2 INPUT | 1 max. | watt |
| PLATE DISSIPATION | 5 max. | watts |

**Maximum Circuit Values:**

| | | |
|---|---|---|
| Grid-No.1-Circuit Resistance: | | |
| For fixed-bias operation | 0.1 max. | megohm |
| For cathode-bias operation | 0.25 max. | megohm |

### RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy[c]
### and
### RF POWER AMPLIFIER — Class C FM Telephony

**Maximum CCS[d] Ratings,** *Absolute-Maximum Values:*

| | | |
|---|---|---|
| DC PLATE VOLTAGE | 300 max. | volts |
| DC GRID No.3 (SUPPRESSOR GRID) | *Connect to cathode at socket* | |
| DC GRID-No.2 (SCREEN-GRID) VOLTAGE | 175 max. | volts |
| DC GRID-No.1 (CONTROL-GRID) VOLTAGE: | | |
| Negative-bias value | 50 max. | volts |
| DC PLATE CURRENT | 33 max. | ma |
| DC GRID-No.2 CURRENT | 5.5 max. | ma |
| DC GRID-No.1 CURRENT | 3 max. | ma |
| GRID-No.2 INPUT | 1 max. | watt |
| PLATE DISSIPATION | 5 max. | watts |

**Typical Operation:**

*At frequencies up to 40 Mc*

| | | | | |
|---|---|---|---|---|
| Heater Voltage | 13.5 | 13.5 | 13.5 | volts |
| DC Plate Voltage | 200 | 250 | 300 | volts |
| Grid No.3 | *Connected to cathode at socket* | | | |
| DC Grid-No.2 Voltage | 115 | 145 | 175 | volts |
| DC Grid-No.1 Voltage | -7 | -9 | -12 | volts |
| Peak RF Grid-No.1 Voltage | 9 | 11 | 16 | volts |
| DC Plate Current | 14.5 | 20 | 26 | ma |
| DC Grid-No.2 Current | 3 | 4.1 | 5.5 | ma |
| DC Grid-No.1 Current (Approx.) | 0.6 | 0.85 | 1 | ma |

| | | | | |
|---|---|---|---|---|
| Driving Power (Approx.) | 10 | 12 | 15 | mw |
| Power Output (Approx.) | 1.5 | 2.7 | 4 | watts |

**Maximum Circuit Values:**

| | | |
|---|---|---|
| Grid-No.1-Circuit Resistance | 0.1 max. | megohm |

## FREQUENCY MULTIPLIER

**Maximum CCS[d] Ratings,** *Absolute-Maximum Values:*

*Same as for RF POWER AMPLIFIER & OSCILLATOR*

**Typical Operation:**

*As doubler up to 40 Mc*

| | | | | |
|---|---|---|---|---|
| DC Plate Voltage | 200 | 250 | 300 | volts |
| Grid No.3 | *Connected to* | *cathode* | *at* | *socket* |
| DC Grid-No.2 Voltage | 115 | 145 | 175 | volts |
| DC Grid-No.1 Voltage | -16 | -20 | -25 | volts |
| Peak RF Grid-No.1 Voltage | 19 | 24 | 31 | volts |
| DC Plate Current | 11 | 15 | 20 | ma |
| DC Grid-No.2 Current | 2 | 3 | 4 | ma |
| DC Grid-No.1 Current (Approx.) | 0.3 | 0.45 | 0.6 | ma |
| Driving Power (Approx.) | 5 | 9 | 13 | mw |
| Useful Power Output (Approx.) | 1.4 | 1.9 | 2.5 | watts |

**Maximum Circuit Values:**

| | | |
|---|---|---|
| Grid-No.1-Circuit Resistance | 0.1 max. | megohm |

[a] The heater will take momentary excursions of 11.0 to 16.0 volts.

[b] Without external shield.

[c] Key-down conditions per tube without amplitude modulation. Amplitude modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

[d] Continuous Commercial Service.

## CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

| | *Note* | *Min.* | *Max.* | |
|---|---|---|---|---|
| Heater Current | 1 | 0.260 | 0.290 | amp |
| Transconductance | 1,2 | 8500 | 14500 | μmhos |
| Plate Current | 1,3 | 13 | 25 | ma |
| Grid-No.2 Current | 1,3 | 2 | 5 | ma |
| Reverse Grid-No.1 Current | 1,4 | - | 1.5 | μa |
| Heater-Cathode Leakage Current: | | | | |
| Heater negative with respect to cathode | 1,5 | - | 20 | μa |
| Heater positive with respect to cathode | 1,5 | - | 20 | μa |
| Leakage Resistance: | | | | |
| Between grid-No.1 and all other electrodes tied together | 1,6 | 50 | - | megohms |
| Between plate and all other electrodes tied together | 1,7 | 50 | - | megohms |

Note 1: With ac or dc heater volts = 13.5.

Note 2: With dc-plate-supply volts = 250, grid-No.2 volts = 150, grid No.3 connected to cathode at socket, cathode resistor (ohms) = 120, and cathode-bypass capacitor ($\mu$f) = 1000.

Note 3: With dc plate-supply volts = 250, grid-No.2 supply volts = 150, grid No.3 connected to cathode at socket, and cathode resistor (ohms) = 120.

Note 4: With dc plate-supply volts = 250, grid-No.2 supply volts = 150, grid No.3 connected to cathode at socket, cathode resistor (ohms) = 120, and grid-No.1 resistor (megohms) = 1.

Note 5: With 100 volts dc between heater and cathode.

Note 6: With grid No.1 100 volts negative with respect to all other electrodes tied together.

Note 7: With plate 300 volts negative with respect to all other electrodes tied together.

## SPECIAL RATINGS & PERFORMANCE DATA

### Heater-Cycling Life Performance:

This test is performed on a sample lot of tubes from each production run. A minimum of 2000 cycles of intermittent operation is applied under the following conditions: heater volts = 19.5 cycled one minute on and two minutes off, heater 135 volts negative with respect to cathode, and all other elements connected to ground. At the end of this test, tubes are checked for heater-cathode shorts and open circuits.

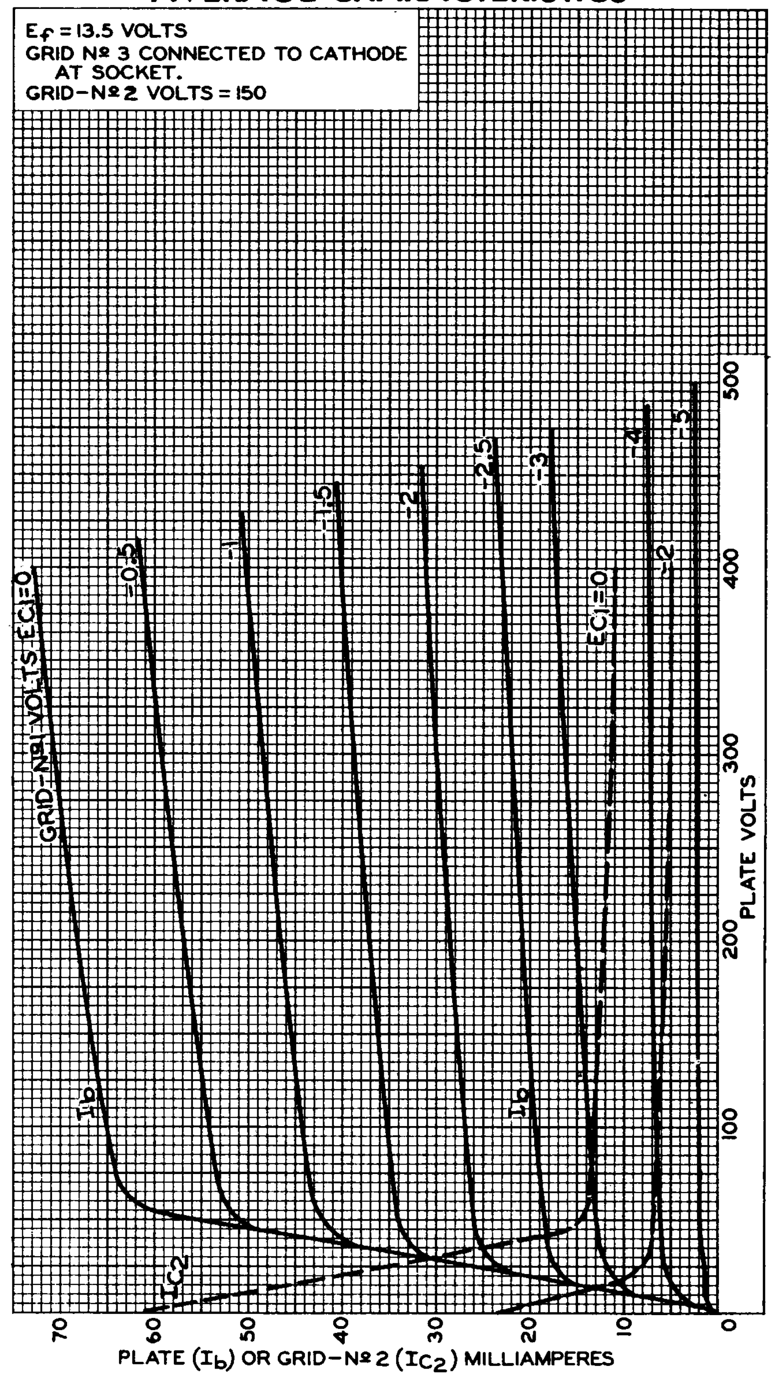
### Low-Frequency Vibration Performance:

This test is performed on a sample lot of tubes from each production run under the following conditions: heater volts = 13.5, plate-supply volts = 250, grid No.3 connected to cathode, grid-No.2 supply volts = 150, cathode resistor (ohms) = 120, cathode-bypass capacitor ($\mu$f) = 1000, plate load resistor (ohms) = 2000, and vibrational acceleration of 2.5 g at 25 cps. In this test, the rms output voltage must not exceed 150 millivolts.

### 500-Hour Intermittent Life Performance:

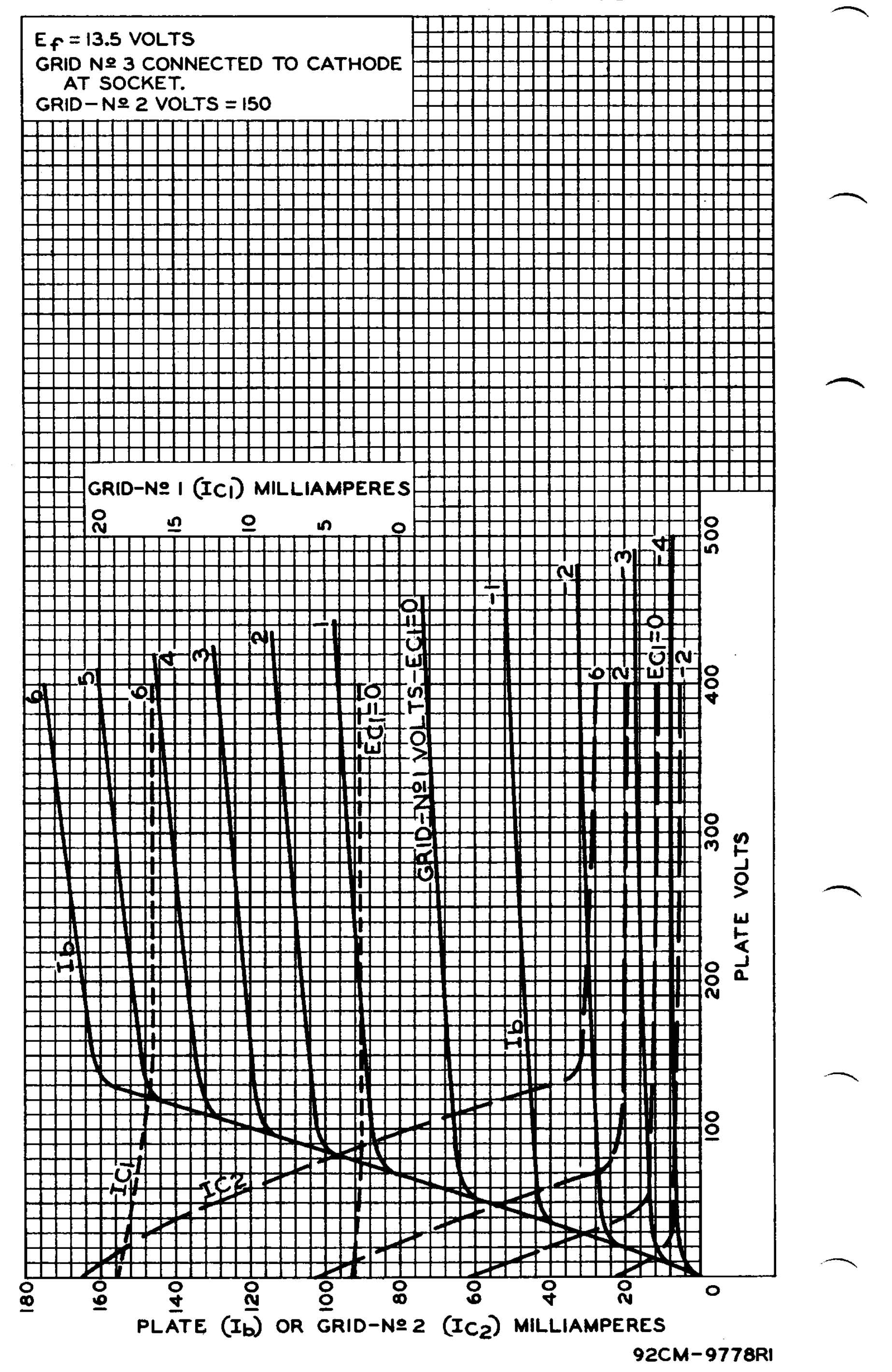
This test is performed on a sample lot of tubes from each production run to insure high quality of the individual tube and to guard against epidemic failures. Life testing is conducted under the following conditions: heater volts = 15 and maximum-rated plate dissipation and grid-No.2 input.

## AVERAGE CHARACTERISTICS



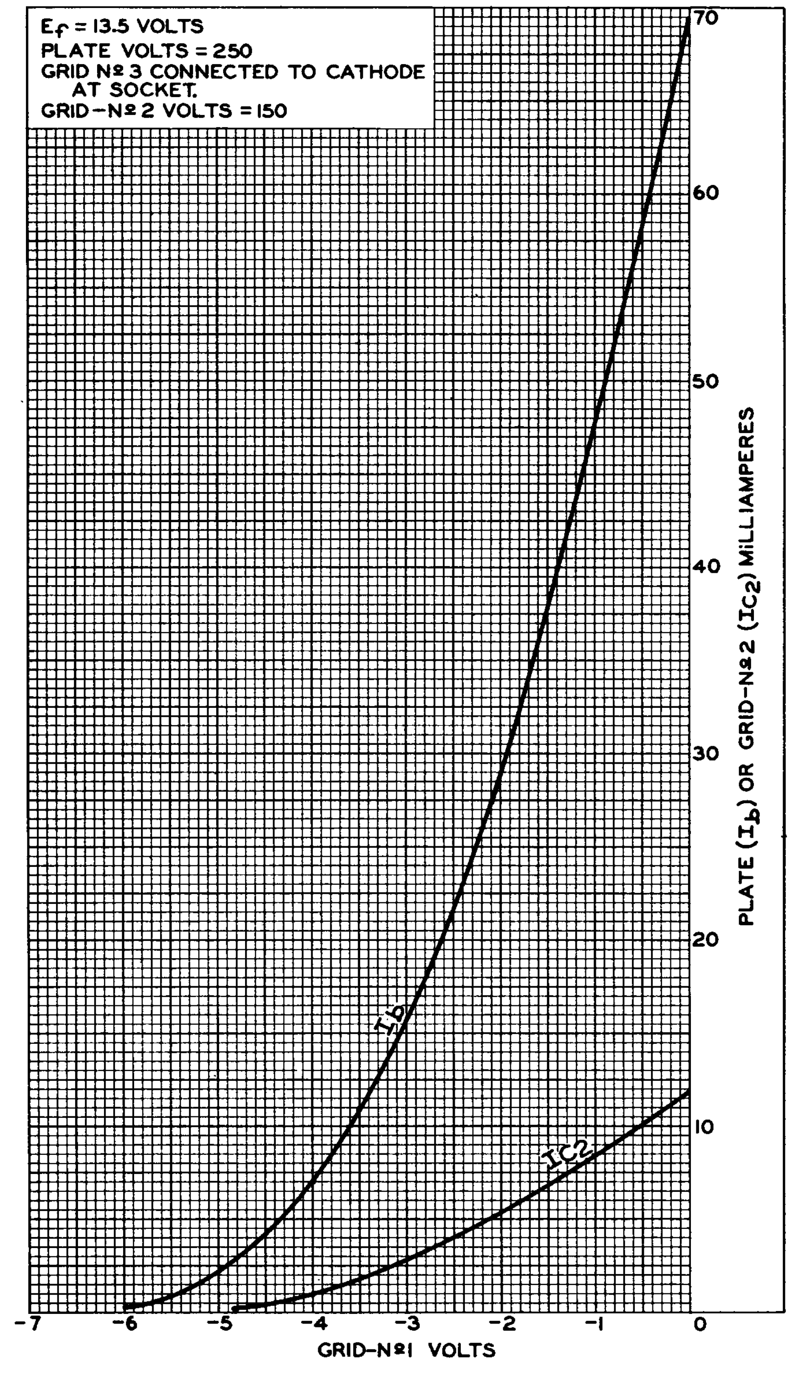

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## AVERAGE CHARACTERISTICS



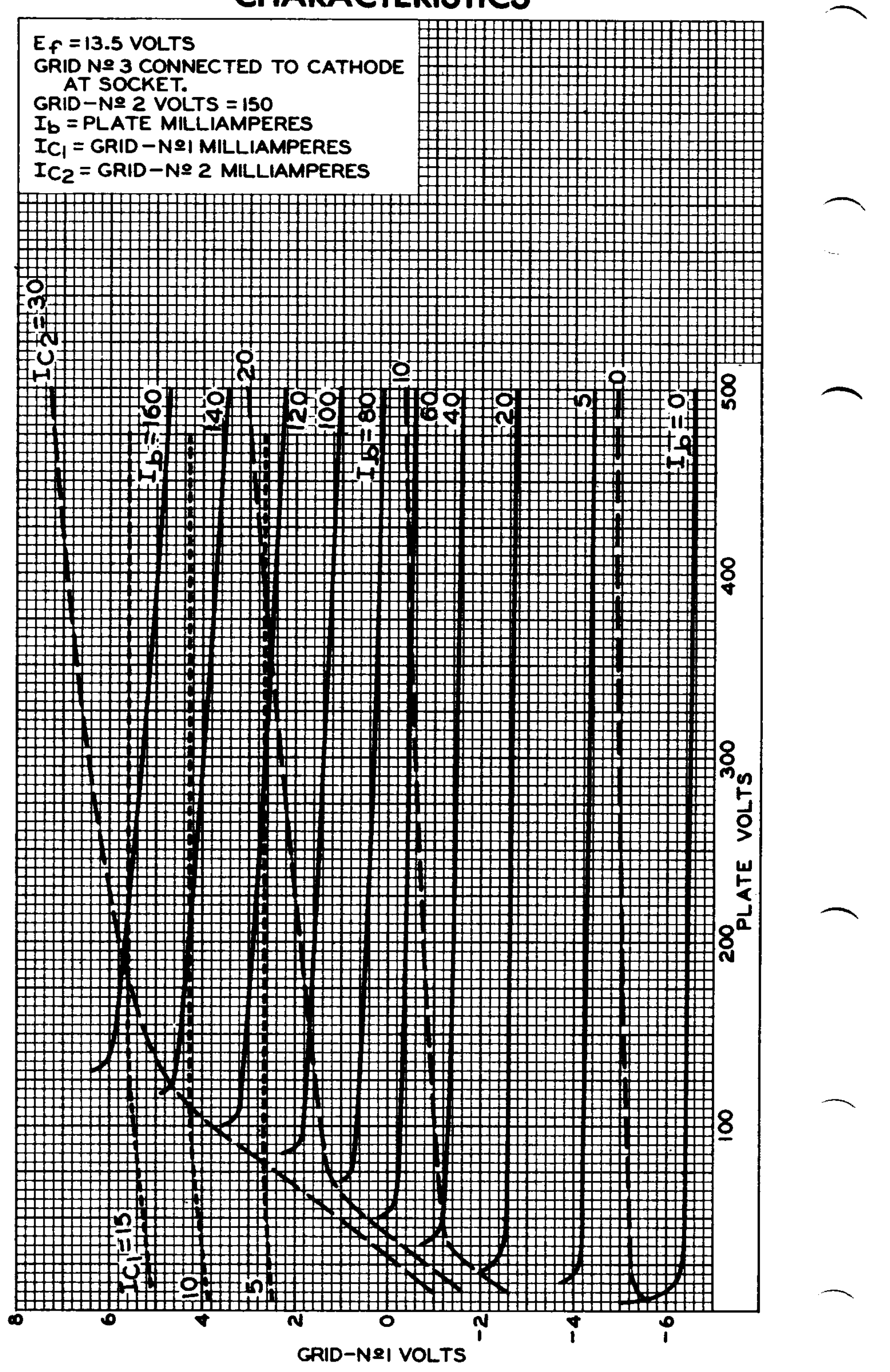

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## AVERAGE CHARACTERISTICS




92CM-9775R1

## AVERAGE CONSTANT-CURRENT CHARACTERISTICS




92CM-9776R1